

CLAIMS

1 A master station of a master/slave surgery system, adapted to be manually manipulated by a surgeon to, in turn, control motion at a slave station at which is disposed a surgical instrument in response to the surgeon manipulation, said master station comprising:

5 a lower positioner assembly;

 an upper positioner assembly supported over said lower positioner assembly and rotational relative to said lower positioner assembly to enable lateral side-to-side surgeon manipulation; and

 an arm assembly having a hand assembly at its distal end for engagement by the surgeon's hand, and a proximal end pivotally supported from said upper positioner assembly to enable an orthogonal forward-and-back surgeon manipulation in a direction substantially orthogonal to the lateral surgeon manipulation.

2. A master station as claimed in claim 1 wherein said arm assembly includes a proximal arm member and a distal arm member coupled by a rotational joint.

3. A master station as claimed in claim 2 including a position encoder at said rotational joint to detect rotation of the distal arm member..

4. A master station as claimed in claim 3 including a pivotal joint connecting said hand assembly to a distal end of said distal arm member.

5. A master station as claimed in claim 4 including a position encoder at said pivotal joint to detect pivoting of the hand assembly.

6. A master station as claimed in claim 5 wherein said hand assembly includes a
5 base piece and a pair of holders coupled from said base piece.

7. A master station as claimed in claim 6 wherein one of said holders is adapted to receive a thumb and the other holder is adapted to receive a forefinger.

8. A master station as claimed in claim 7 wherein said holders each comprise a metal
10 bar and a Velcro loop.

9. A master station as claimed in claim 7 wherein said hand assembly further includes a pair of rotating elements pivotally supported from opposite ends of said base piece.

10. A master station as claimed in claim 9 wherein one of said holders is secured to one of said rotating elements so that the surgeon can move said one holder toward and away from the other holder.

11. A master station as claimed in claim 10 wherein the pivotal joint that connects the
20 hand assembly to the distal end of the distal arm member is connected to the other rotating element of the pair of rotating elements.

12. A master station as claimed in claim 10 including a position encoder at each of said pair of rotating elements.

13. A master station as claimed in claim 1 including a pivotal joint connecting the
5 hand assembly to a distal end of the arm assembly.

14. A master station as claimed in claim 13 wherein said hand assembly includes a base piece and a pair of holders coupled from said base piece.

15. A master station as claimed in claim 14 wherein one of said holders is adapted to receive a thumb and the other holder is adapted to receive a forefinger.

16. A master station as claimed in claim 15 wherein said hand assembly further includes a pair of rotating elements pivotally supported from opposite ends of said base piece.

17. A master station as claimed in claim 16 wherein one of said other holders is secured to one of said rotating elements so that the surgeon can move said one holder toward and away from the other holder.

18. A master station is claimed in claim 17 wherein the pivotal joint that connects the
20 hand assembly to the distal end of the arm assembly is connected to the other rotating element of the pair of rotating elements.

19. A master station as claimed in claim 2 wherein said proximal arm member comprises a pair of parallel-disposed arms and a pair of support pieces for the arms, each of the arms being pivotally supported at respective ends thereof in said support pieces.

5 20. A master station as claimed in claim 19 wherein one of said support pieces forms part of said rotational joint between the proximal and distal arm members.

21. A master station as claimed in claim 20 wherein the other of said support pieces forms part of said pivotal support of said proximal end of said arm assembly about said lower positioner assembly.

22. A master station as claimed in claim 21 including a counter-weight on said other support piece.

15 23. A master station as claimed in claim 1 wherein the lower positioner assembly includes a motor and encoder.

24. A master station as claimed in claim 1 wherein the upper positioner assembly includes a substantially upright frame rotational relative to the lower positioner assembly, said
20 substantially horizontal axis disposed at a top of said upright frame.

25. A master station as claimed in claim 24 wherein an upper shaft supported from said frame establishes said horizontal axis, and further including a second horizontal shaft below said upper shaft.

5 26. A master station as claimed in claim 25 including a belt and pulley arrangement for intercoupling said shafts.

27. A master station as claimed in claim 26 including position encoders engaged with said lower shaft.

28. A master station of a master/slave surgery system adapted to be manually manipulated by a surgeon to, in turn, control motion at a slave station at which is disposed a surgical instrument in response to the surgeon manipulation, said master station comprising:

a base;

an arm assembly pivotally supported from the base; and

a hand assembly pivotally supported from said arm assembly;

said hand assembly including a finger holder and a thumb holder, and

wherein said holders are supported for relative movement therebetween.

20 29. A master station as in claim 28, wherein said hand assembly also includes a base piece for said holders.

30. A master station as in claim 29, wherein said thumb holder is fixed in position relative to said base piece and said finger holder rotates from said base piece.

31. A master station of a master/slave surgery system adapted to be manually manipulated by a surgeon to, in turn, control motion at a slave station at which is disposed a surgical instrument in response to the surgeon manipulation, said master station comprising:

- a base;
- an arm assembly pivotally supported from the base; and
- a hand assembly pivotally supported from said arm assembly;

said hand assembly including a guide shaft adapted to be grasped by the surgeon, an actuator button or switch on said guide shaft, and a multiple rotation joint connecting said guide shaft to said arm assembly.

32. In a surgical instrument system having an instrument that is adapted to be inserted through an incision point into the patient for positioning a distal end of the instrument at an operative site within the patient, the system being adapted for operation by a surgeon from outside the patient, wherein the system includes a slave station having a support for the surgical instrument, the improvement comprising;

- a template secured to the support for locating the position of said support, and subsequently said surgical instrument, relative to the incision point of the patient.